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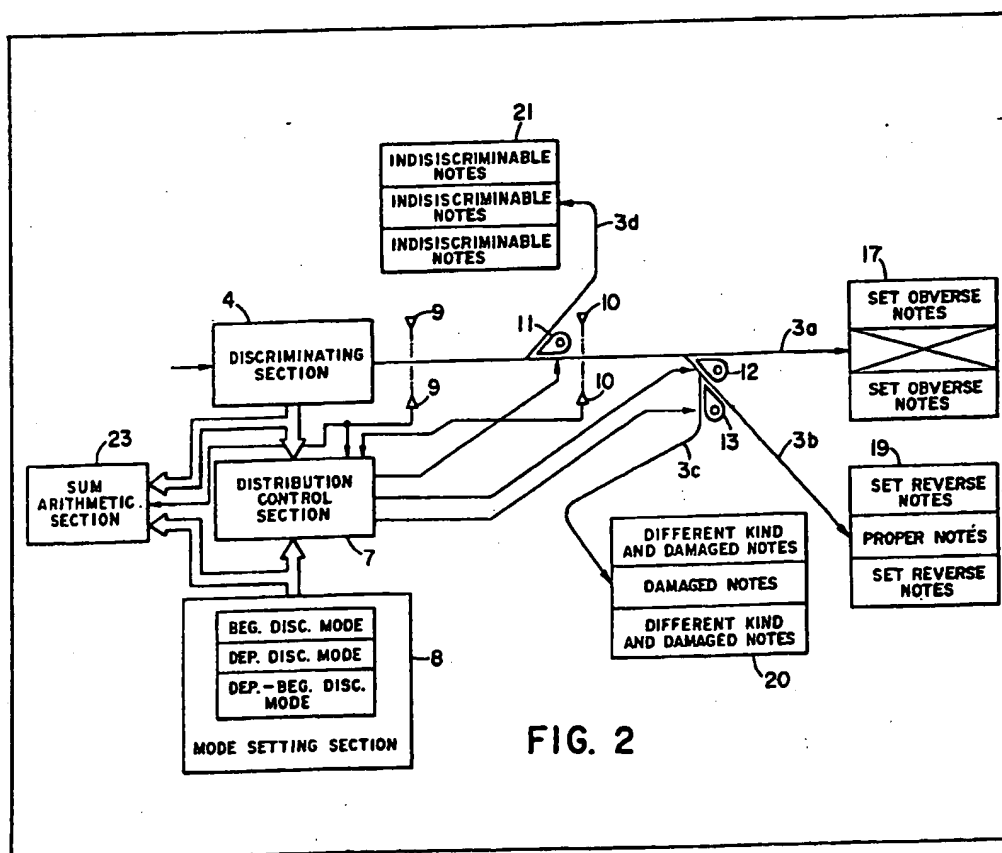
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(54) Bank note arrangement
 machine

(57) A bank note arrangement
 machine has a bank note
 discriminating section (4) for
 discriminating valves and/or

orientation of notes, and for
 recognising damaged notes or when
 the note carrier is discriminated. A
 mode setting section (8) is provided in
 the bank note arrangement machine
 by which various modes for
 performing different tasks can be set.
 A distribution control section (7) is
 also provided in the machine which
 distributes the notes in accordance
 with the discrimination of the
 discriminating section and the mode
 selected at the mode setting section.



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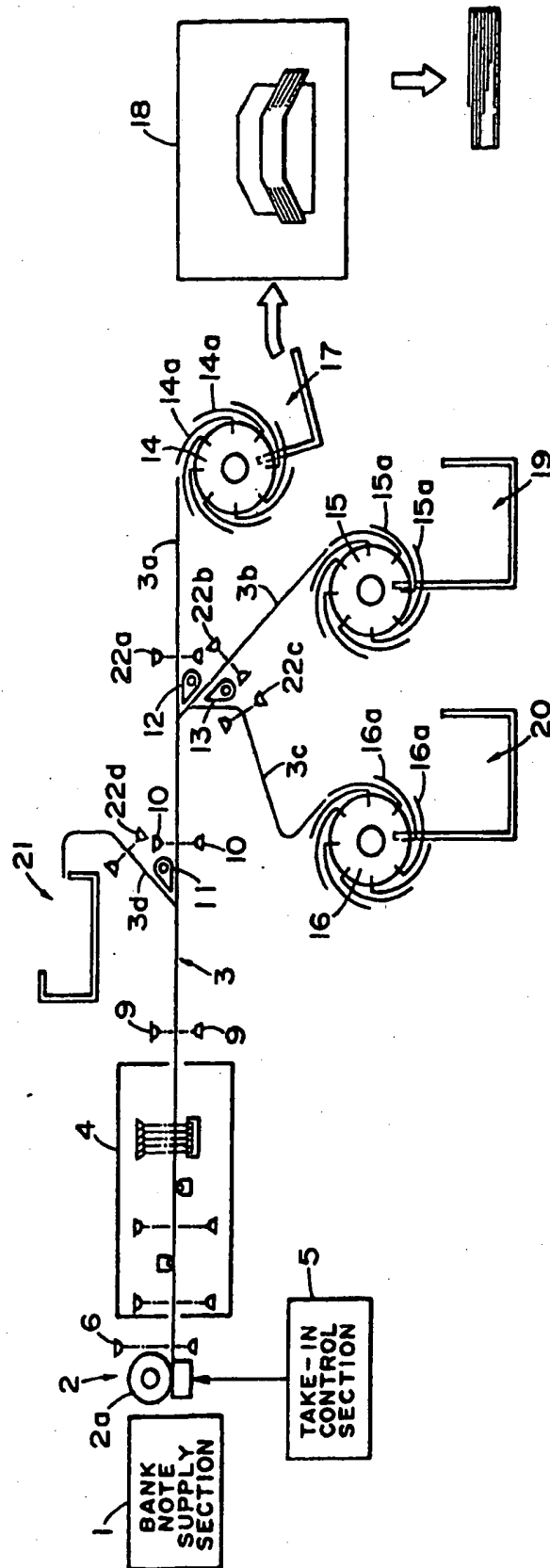


FIG. 1

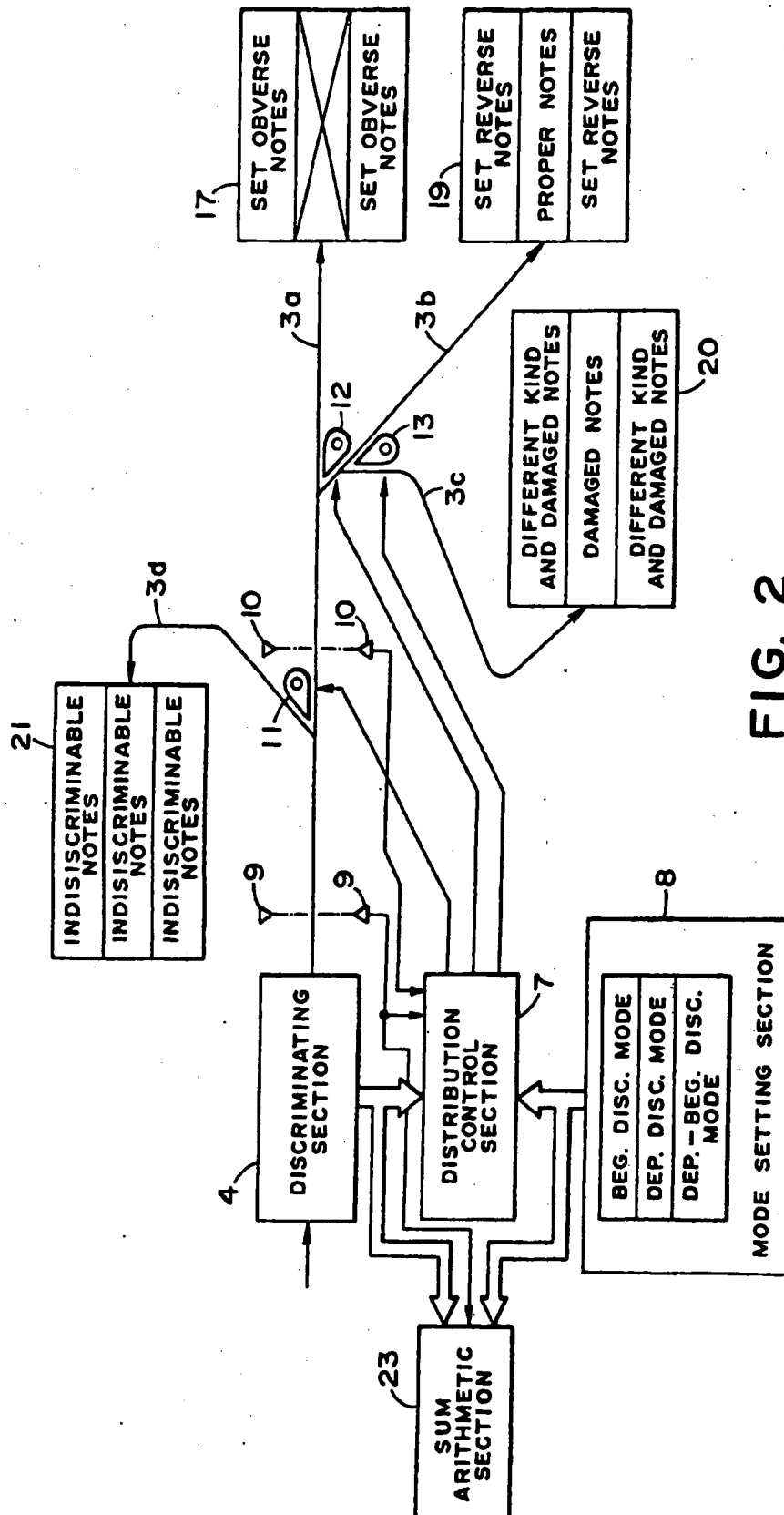


FIG. 2

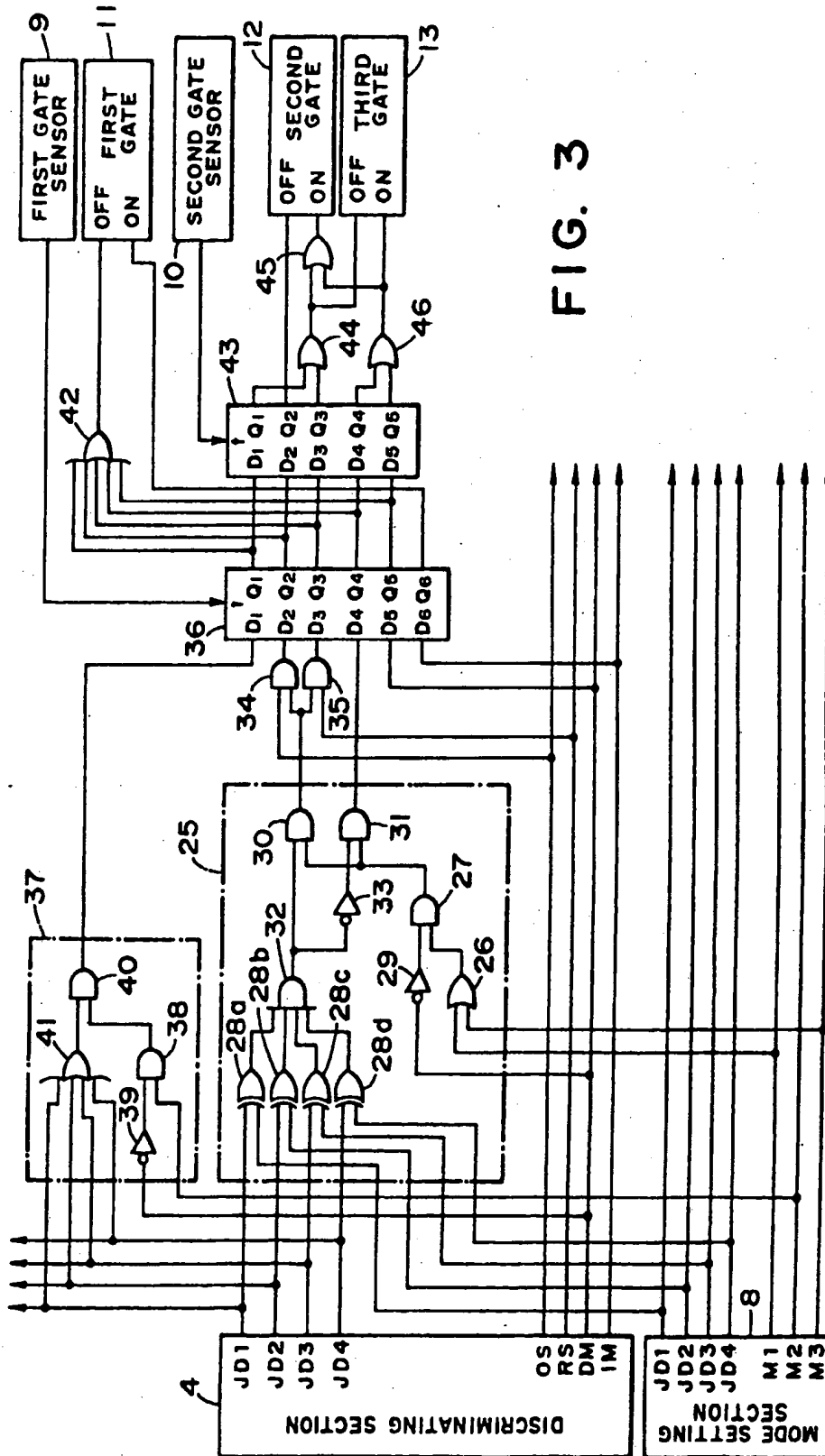


FIG. 3

BEGINNING DISCRIMINATION MODE	SET OBVERSE NOTES SET REVERSE NOTES TOTAL OF SET OBVERSE AND REVERSE NOTES
DEPOSIT MODE	PROPER NOTES DAMAGED NOTES TOTAL OF PROPER AND DAMAGED NOTES
DEPOSIT-BEGINNING	SET OBVERSE NOTES SET REVERSE NOTES SUBTOTAL OF DIFFERENT KIND AND DAMAGED NOTES TOTAL OF SET OBVERSE, SET REVERSE, DIFFERENT KIND AND DAMAGED NOTES

FIG. 4

SPECIFICATION

Bank note arrangement machine

Background of the Invention

This invention relates to a bank note

5 arrangement machine which can change the classification of bank notes among groups thereof in accordance with the contents of the groups.

In general, it has been known that a bank note arrangement machine has three functions. The
10 first function is a so-called "beginning discrimination" function in which bank notes already classified into groups by kind or type are re-discriminated for confirmation. That is, in the function, bank notes already classified visually by
15 tellers into groups by kind of note after the bank notes have been received over the counter at the bank are re-discriminated for confirmation and in addition the notes of each group are divided into hundred-note bundles with the obverse surface of
20 the notes positioned on the same side. The second function is a classification function in which mixed notes are classified into groups each consisting of a specific or particular kind of note. That is, the notes of a group consisting of various kinds of
25 notes stored in no particular order in for example a bank note deposit machine are classified into groups by particular kind of note. The third function is a deposit function.

In conventional bank note arrangement
30 machines, there has not been provided a so-called "deposit-beginning discrimination" function which will be described hereinafter in more detail. That is, in the deposit-beginning discrimination function, the sum total of the group of the various
35 kinds of bank notes deposited in the deposit machine is calculated and at the same time the bank notes (the kind contained in the greatest quantity as judged visually when charged as
40 groups of bank notes) are divided into hundred-note bundles of the same particular type with the obverse surfaces of the notes aligned on the same side.

For this, the conventional bank note arrangement machines have a disadvantage in
45 that the mixed notes of a group have to be classified beforehand by kind.

Summary of the Invention

It is, therefore, an object of the invention to provide a bank note arrangement machine which
50 has a deposit-beginning discrimination function as well as a beginning discrimination function and a deposit function, and with the ability to select any one of these functions.

In accordance with the present invention, there
55 is provided a bank note arrangement machine which comprises a discriminating section provided at a note path for discriminating notes and issuing signals in accordance with the result of the discrimination, a mode setting section having a
60 plurality of modes and issuing control signals for indicating the classification of the notes in accordance with the mode selected from among said plurality of modes, and a distribution control

section for controlling gates to distribute the notes
65 in response to the control signals supplied from the mode setting section and the signals supplied from the discriminating section.

Description of the Drawings

Other objects and advantages of the present
70 invention will become apparent from the following description made with reference to the accompanying drawings, in which:

Fig. 1 is a schematic view showing in outline the construction of a bank note arrangement
75 machine according to the present invention;

Fig. 2 is a block diagram for explaining the condition categories of the bank notes classified and accumulated in accordance with the selected
80 mode of operation;

Fig. 3 is a circuit diagram showing the details of the distribution control section and associated sections included in the bank note arrangement machine; and,

Fig. 4 is a table showing the contents indicated
85 in each mode.

Description of the Preferred Embodiment

One embodiment of the present invention will now be described in detail with reference to the accompanying drawings.

90 In Figs. 1 and 2, a reference numeral 1 indicates a note supply section for supplying notes in a group or notes deposited by customers to a note take-in section 2. The notes in the supply section 1 are taken in, one at a time, by a take-in roller 2a in the take-in section 2 and the notes thus taken in are supplied to a note discriminating section 4 by means of a conveyance path 3. A
95 reference numeral 5 indicates a take-in control section which controls the operation of the note take-in section on the basis of outputs from a note detecting sensor 6 and outputs from the discriminating section 4 and a mode setting section 8, which will be described later. The details of the take-in control section 5 will be
100 apparent from the applicant's U.K. patent application 81 11 067 (Serial No. 2073926). The take-in control section 5 is constructed so that it works only when a beginning discrimination mode for the beginning the discrimination function or a
105 deposit-beginning discrimination mode for the deposit-beginning discrimination function is selected and does not work when a deposit mode for deposit function is selected. More particularly, when either the beginning discrimination mode or the deposit-beginning discrimination mode is selected, the take-in control section 5 counts and accumulates the number of "1" signals supplied from the sensor 6. The take-in control section 5
110 also detects notes other than set obverse notes or notes of the set kind passing through the sensor with their obverse surfaces uppermost. The detection is made on the basis of each data signal supplied from terminals JD1 to JD4 and terminal
120 M1 or terminal M3 of the mode setting section 8 and each data signal supplied from terminal JD1 to JD4 and terminal OS of the discriminating

section. Then, each time a note which is not a set obverse note is detected, the value "1" is subtracted from the above-mentioned accumulated value to obtain a number indicating the total number of set obverse notes which have passed through the sensor. Then, when the number thus obtained reaches a predetermined number, for example 100, the note take-in operation of the take-in section 2 is stopped. Thus, when the notes accumulated in a first accumulation section 17, which will be described later, are being counted up to 100, surplus take-in of the notes can be prevented.

Furthermore, at the discriminating section, the discrimination of the notes is made on the basis of note width and length, photo-pattern, magnetic-pattern and the like. As a consequence of the discrimination, various signals (discrimination signals) are issued in response to the results of the discrimination results. For example, when the supplied note is not discriminated, that is, when the note cannot be discriminated by means of any one of the discrimination criteria at the discriminating section 4, a "1" signal is issued from terminal IM of the discriminating section (see Fig. 3). When the supplied note is a damaged one, that is, when the note can be discriminated by means of any of the discrimination criteria, but it is found to be inappropriate for circulation, a "1" signal is issued from terminal DM of the discriminating section (see Fig. 3). Furthermore, when the supplied note is not one which cannot be discriminated, the discriminating section issues a "1" signal from any one of the terminals JD1—JD4 in accordance with the kind of the supplied note (see Fig. 3). For example, when the note supplied to the discriminating section 4 is a 10,000-yen note, a "1" signal is issued from the JD1 terminal of the section 4, and when the note is 5000-yen note, a "1" signal is issued from the JD2 terminal. In a similar manner, when the supplied note is a 1000-yen note, a "1" signal is issued from the JD3 terminal of the section 4, and when the note is a 500-yen note, a "1" signal is issued from the JD4 terminal. Furthermore, when a "1" signal is emitted from any one of the terminals JD1—JD4, as mentioned above, the supplied notes are discriminated as to whether the obverse surface or the reverse surface is uppermost. As a result, when the obverse surfaces of the supplied notes are uppermost, a "1" signal is issued from the OS terminal (see Fig. 3) and on the other hand, when the reverse surfaces are uppermost, a "1" signal is issued from the RS terminal (see Fig. 3). In this way, the signals issued from the discriminating section 4 are supplied to a distribution control section 7 and to a sum arithmetic section 23, which will be described later.

Furthermore, at the mode setting section 8, control signals are issued according to which mode is selected from among the three modes. For example, when the beginning discrimination mode is selected, a "1" signal is issued from the M1 terminal (see Fig. 3) of the mode setting

section 8. At the same time a signal that is in accordance with the kind of notes selected is emitted. For example, when 10,000-yen notes are set or selected, a "1" signal is issued from the terminals JD2 to JD4 of the mode setting section 8 shown in Fig. 3. When the 5,000-yen note is set, a "1" signal is issued from the terminals JD1, JD3 and JD4 of the mode setting section 8. In a similar manner, when the 1,000-yen note is set, a "1" signal is issued from the terminals JD1, JD2 and JD4, and when the 500-yen note is set, a "1" signal is issued from the terminals JD1 to JD3. Also, when the deposit beginning discrimination mode is selected at the mode setting section 8, a "1" signal is issued from the M3 terminal (see Fig. 3) and at the same time a signal that is in accordance with the selected kind of notes is issued in a manner similar when the beginning discrimination mode is selected. When the deposition mode is selected at the mode setting section 8, a "1" signal is issued from the M2 terminal (see Fig. 3). Signals issued thus from the mode setting section 8 are supplied to the distribution control section 7 and to the sum arithmetic section 23. The reference numeral 9 indicates a first gate sensor for detecting the passage of notes; when the first gate sensor 9 detects a note, a "1" signal is supplied from the first gate sensor 9 to the distribution control section 7 and the sum arithmetic section 23. The reference numeral 10 indicates a second gate sensor for detecting the passage of note in the same way as the first gate sensor 9; the output of the second gate sensor ("1" signals) is supplied to the distribution control section 7. As described in detail later and with reference to Figs. 2 and 3, the distribution control section 7 controls the first gate 11, the second gate 12 and the third gate 13, respectively in accordance with output signals from the discriminating section 4, and the mode setting section 8, and the output signals from the first gate sensor 9 and the second gate sensor 10. Specifically, the supply of a "1" signal to the "ON" input terminals of the gates 11 to 13, shown in Fig. 3, causes the first gate 11 to rotate in an anti-clockwise direction and the second gate 12 and the third gate 13 to be rotated in a clockwise direction. On the other hand, the supply of a "1" signal to the "OFF" input terminals of the gates 11 to 13, causes the first gate 11 to be rotated in a clockwise direction, and the second gate 12 and the third gate 13 to be rotated in an anti-clockwise direction, so that the gates return to their initial positions as shown in Fig. 2. In this manner, the switching of the conveyance path can be carried out by the gates 11, 12 and 13. The reference numerals 14 to 16 indicate rotary carriers. The rotary carriers 14 to 16 are provided at their peripheries with a plurality of holding plates 14a, 15a and 16a, respectively. Thus the notes conveyed through a branch path 3a are put and held between the holding plates 14a. The notes thus held are moved by the clockwise rotation of the rotary carrier 14 into a first accumulating section 17 to be accumulated.

When the number of the notes accumulated in the accumulating section 17 reaches the pile of 100 notes is forwarded to the bundling section 18 to be bundled therein. In this embodiment of the present invention, the first accumulating section 17 is used for the beginning discrimination mode and the deposit-beginning discrimination mode and is not used for the deposit mode. As a consequence, the accumulating section 17 has a small accumulation capacity.

The notes conveyed through a branch path 3b are put and held between holding plates 15a. The notes thus held are accumulated in a second accumulating section 19 through the rotation of the rotary carrier 15. In a similar manner, the notes conveyed through a branch path 3c are accumulated in a third accumulating section 20, and the notes conveyed through a branch path 3d are accumulated in a fourth accumulating section 21. So in this embodiment, groups of notes shown in Fig. 2 are accumulated in the first accumulating section 17, the second accumulating section 19, the third accumulating section 20 and the fourth accumulation section 21, respectively. That is when the beginning discrimination mode is selected at the mode setting section 8, the set obverse notes (the notes, the kind of which is set at the mode setting section, with the obverse surfaces uppermost are accumulated in the first accumulating section, and the set reverse notes (the notes, the kind of which is set at the mode setting section with the reverse surfaces uppermost) are accumulated in the second accumulating section 19. The notes of different kind (the notes other than the set notes) and the damaged notes which are inappropriate for circulation are accumulated in the third accumulating section, and the discriminable notes are accumulated in the fourth accumulating section 21. In a similar manner, when the deposit mode is selected at the mode setting section 8, the proper notes (the notes appropriate for circulation are accumulated in the second accumulating section 19, the damaged notes are accumulated in the third accumulating section 20, and the indiscriminable notes are accumulated in the fourth accumulating section 21. Furthermore, when the deposit-beginning discrimination mode is selected at the mode setting section 8, the set obverse notes are accumulated in the first accumulating section 17, the set reverse notes are accumulated in the second accumulating section 19, the different kind of notes and the damaged notes are accumulated in the third accumulating section 20, and the indiscriminable notes are accumulated in the fourth accumulating section 21. Sensors 22a to 22d are provided at the respective corresponding branch paths 3a to 3d; to detect the notes passing through each of the respective branch paths 3a to 3d, so as to supply corresponding signals to the distribution control section 7 and the sum arithmetic section 23. Furthermore, each time the "1" signal is supplied from the first gate sensor 9, at the sum arithmetic section 23 the "1" signals supplied from terminals

JD1 to JD4 and terminals M1 to M3 of the mode setting section 8, and the "1" signals supplied from terminals JD1 to JD4, the OS terminal, the RS terminal and the DM terminal of the discriminating section 4 are decoded to obtain data on the kinds of notes and the quantity of each kind of notes. The necessary total sum data can then be obtained from the above-mentioned data. In other words, at the sum arithmetic section 23, the sum data is obtained on the basis of output signals of the mode setting section 8 and the discriminating section 4. For example, in the beginning discrimination mode, sum data for the set obverse notes, sum data for the set reverse notes and the total of the two sum data are obtained, as shown in Fig. 4. In the deposit mode, the sum data for the proper notes, sum data for the damaged notes and the total of the two sum data are obtained. In the deposit-beginning discrimination mode, sum data for the set obverse notes, sum data for the set reverse notes, subtotal sum data for the different kind of notes and damaged notes and the total sum data for the set obverse notes, the set reverse notes, the different kinds of notes and damaged notes are obtained. Each sum data thus obtained in accordance with each mode is supplied to a display section, not shown.

Fig. 3 is a circuit diagram showing one embodiment of the distribution control section 7 shown in Fig. 2. Each output signal from the M1 terminal and the M3 terminal of the mode setting section 8 is supplied to one input terminal of an AND gate 27 through an OR gate 26 in a set note detecting circuit 25, and each output signals from terminals JD1 to JD4 of the mode setting section 8 is supplied to one input terminal of each of the corresponding Exclusive OR gates 28a to 28d in the set note detecting circuit 25. Furthermore, each output signal from terminals JD1 to JD4 of the discriminating section 4 is supplied to the other input terminal of each of the corresponding Exclusive OR gates 28a to 28d in the set note detecting circuit 25, and the output signal from the DM terminal of the discriminating section 4 is supplied to the other input terminal of the AND gate 27 through an inverter 29 in the set note detecting circuit 25. The output of the AND gate 27 is supplied to one input terminal of each AND gate 30 and 31. On the other hand, each output signal of the Exclusive OR gates 28a to 28d is supplied to the input terminal of an AND gate 32. The output signal of the AND gate 32 is supplied to the other input terminal of the AND gate 30 and to the other input terminal of the AND gate 31 through an inverter 33. Thus, in the set note detecting circuit 25, when the beginning discrimination mode or the deposit beginning discrimination mode is set at the mode setting section 8, so that therefore a "1" signal is supplied from the M1 terminal or the M3 terminal, if the data for kind of notes obtained from terminals JD1 to JD4 of the mode setting section 8 in accordance with mode set at the section 8 is coincident with data for kind of notes obtained

from terminals JD1 to JD4 of the discriminating section 4 (data indication of the kind of the supplied notes), a "1" signal is issued from the AND gate 30 of the set note detecting circuit 25.

5 The "1" signal thus issued is supplied to one input terminal of each AND gate 34 and 35. Assuming that the mode setting section 8 is set for 10,000-yen notes, each "1" signal issued from each of the terminals JD2 to JD4 of the mode setting section

10 8 is supplied to each corresponding Exclusive OR gates 28b to 28d. At this time, when the "1" signal indicating a 10,000-yen note is supplied from the JD1 terminal of the discriminating section 4 to the Exclusive OR gate 28a, the "1"

15 signal is supplied from the set note detecting circuit 25 to each of the AND gates 34 and 35. Under such conditions, when a "1" signal is issued from the OS terminal of the discriminating section 4, a "1" signal is issued from the AND gate 34,

20 and then the "1" signal thus issued is supplied to terminal D2 of a latch circuit 36. When a "1" signal is issued from the RS terminal of the discriminating section 4, a "1" signal issued from the AND gate 35 is supplied to terminal D3 of the latch circuit 36. This is also the case when other

25 kinds of notes (for example, 5,000-yen notes, 1,000-yen notes, 500-yen notes) are set at the mode setting section 8. On the other hand, when the data on the kind of note supplied from the mode setting section 8 and the data on the kind of note supplied from the discriminating section 4 do

30 not coincide with each other, as, for example, when the 10,000-yen note is set at the mode setting section 8 so that the "1" signal is supplied to each of the Exclusive OR gates 28b to 28d in the set note detecting circuit 25, and data

35 indicating the kind of note in a 1,000-yen note is issued from the discriminating section 4, the "1" signal is supplied from the section 4 to the Exclusive OR gate 28c, so that the AND gate 32 in

40 the set note detecting circuit 25 does not issue the "1" signal. As a result, a "1" signal is not supplied from the set note detecting circuit 25 to each of the AND gates 34 and 35, while a "1"

45 signal is supplied from the set note detecting circuit 25 to the D4 terminal of the latch circuit 36. Furthermore, when the beginning discrimination mode or the deposit-beginning discrimination mode is set up at the mode setting

50 section 8, and the "1" signal is supplied from the set note detecting circuit 25 to the AND gate 34 or 35 or to terminal D4 of the latch circuit 36, should a "1" signal be issued from the DM terminal of the discriminating section 4, the

55 output of the inverter 29 in the set note detecting circuit 25 is inverted and, therefore, the AND gate 27 does not issue the "1" signal. As a result, the set note detecting circuit 25 does not supply the "1" signal to AND gate 34 or 35 or to the D4

60 terminal of the latch circuit 36. But at the same time the "1" signal issued from the DM terminal of the discriminating section 4 is supplied to the D5 terminal of the latch circuit 36.

Furthermore, the output signal issued from the

65 M2 terminal of the mode setting section 8 is

supplied to one input terminal of an AND gate 38 in a proper note detecting circuit 37, and also the output signal from the DM terminal of the discriminating section 4 is supplied to the other

70 input terminal of the AND gate 38 through an inverter 39 in the proper note detecting circuit 37. The output signal of the AND gate 38 is supplied to one input terminal of an AND gate 40. Also, each output signal emitted from terminals JD1 to

75 JD4 of the discriminating section 4 is supplied to the input terminals of an OR gate 41, and the output signal of the OR gate 41 is supplied to the other input terminal of the AND gate 40. In other words, in case where the deposit mode is set up at

80 the mode setting section 8 so that in the proper note detecting circuit 37 by the "1" signal is issued from the M2 terminal, when the data indicating the kind of notes are issued from terminals JD1 to JD4 of the discriminating section

85 4, the "1" signal is emitted from the proper note detecting circuit 37 and is supplied to the D1 terminal of the latch circuit 36. Thus, when the deposit mode is set at the mode setting section 8 and the "1" signal is supplied to the AND gate 38

90 in the proper note detecting circuit 37, if the "1" signal indicating a 10,000-yen note is issued from the JD1 terminal of the discriminating section 4, a "1" signal is issued from the OR gate 41 in the proper note detecting circuit 37. As a result, and

95 therefore supplied to the D1 terminal of the latch circuit 36. Furthermore, in a similar manner when the data indicating any one other kind of notes are issued from terminals JD2 to JD4 of the discriminating section 4, the "1" signal is supplied

100 to the D1 terminal of the latch circuit 36 from the proper note detecting circuit 37. On the other hand, when a "1" signal is supplied to the D1 terminal of the latch circuit 36 from the proper note detecting circuit 37, should a "1" signal be

105 issued from the DM terminal of the discriminating section 4, the output of the inverter 39 in the proper note detecting circuit 37 is caused to be inverted and, therefore, the AND gate 38 does not issue the "1" signal so that the proper note

110 detecting circuit 37 does not supply the "1" signal to the D1 terminal of the latch circuit 36.

Furthermore, the output signal from the IM terminal of the discriminating section 4 is supplied to the D6 terminal of the latch circuit 36, and the

115 output signal from the first gate sensor 9 is supplied to the control terminal (t terminal) of the latch circuit 36. When the "1" signal is supplied to the latch circuit 36 from the first gate sensor 9, the latch circuit 36 latches the signals ("1" signals or "0" signals) which have been supplied to input

120 terminals D1 to D6, and issues the signals from the corresponding output terminals Q1 to Q6. More particularly, in the latch circuit 36, when a "1" signal is supplied to the t terminal, for

125 instance, in cases where the "1" signal has been supplied to the D1 terminal, a "1" signal is issued from the corresponding Q1 terminal. On the other hand, in cases where a "0" signal has been supplied to the D1 terminal, an "0" signal is

130 issued from the corresponding Q1 terminal. In a

similar manner, when a "1" signal is supplied to the t terminal, the latch circuit 36 issues the same signal that have been supplied to the D2 terminal ("1" signal or "0" signal) from the Q2 terminal, and likewise issues the same signals that have been supplied to input terminals D3 to D6 from the corresponding output terminals Q3 to Q6. Each signal issued from terminals Q1 to Q5 of the latch circuit 36 is supplied to an OFF input terminal of the first gate 11 through an OR gate 42, and the signal issued from the Q6 terminal of the latch circuit 36 is supplied to an ON input terminal of the first gate 11. In other words, when the "1" signal is issued from the Q6 terminal of the latch circuit 36, the "1" signal is supplied to the ON input terminal of the first gate 11, and when the "1" signal is issued from any one of terminals Q1 to Q5 of the latch circuit 36, the "1" signal is supplied to the OFF input terminal of the first gate 11. The first gate 11 is constructed to block the "1" signal supplied to its OFF input terminal. With the "1" signal then being supplied to its ON input terminal. In other words, the first gate 11 closes the OFF input terminal when the "1" signal is supplied to its ON input terminal.

Further, signals issued from terminals Q1 to Q6 of the latch circuit 36 are supplied to each of the respective corresponding input terminals D1 to D5 of a latch circuit 43 and the output signal from the second gate sensor 10 is supplied to the t terminal of the latch circuit 43. The operation of the latch circuit 43 is entirely similar to that of the above-mentioned latch circuit 36. Also, each of signals issued from the Q1 terminal and the Q3 terminal of the latch circuit 43 is supplied to an OFF input terminal of a third gate 13 through an OR gate 44 and at the same time to an ON input terminal of the second gate 12 through an OR gate 45. The signal issued from the Q2 terminal of the latch circuit 43 is supplied to an OFF input terminal of the second gate 12. Each signal issued from the Q4 terminal and the Q5 terminal is supplied to an ON input terminal of the third gate 13 through an OR gate 46 and at the same time to an ON input terminal of the second gate 12 through an OR gate 45. The second gate 12 and the third gate 13 are constructed in a manner similar to that of the first gate 11.

Now, the operation of this embodiment will be described with reference to Figs. 1 to 4. Firstly, in the beginning discrimination mode in which each group of notes already classified by kind is re-discriminated, the groups of notes classified and stored by kind are charged in the note supply section 1. Then, the beginning discrimination mode is set at the mode setting section 8 so as to correspond to the kind of the notes to be fed into the note supply section 1. Then a start switch, not shown, is operated, putting each section in an operable condition. At the same time, a "1" signal is issued from the M1 terminal of the mode setting section 8, and supplied to each of the AND gates 30 and 31 through the OR gate 26 and the AND gate 27 in the set note detecting circuit 25, and the data on the kind of notes issued from the

terminals JD1 to JD4 of the mode setting section 8 are supplied to the Exclusive OR gates 28a to 28d in the set note detecting circuit 25. The "1" signal is thus supplied to the D4 terminal of the latch circuit 36 from the set note detecting circuit 25. The first gate sensor 9 not issue a "1" signal at this time and accordingly the "1" signal is not supplied to each of the ON input terminals of the first gate 11, the second gate 12 and the third gate 13. Meanwhile, the depression of the start switch causes the take-in roller 2a at the note take-in section 2 to be rotated, and thereby the notes of the group fed into the note supply section 1 are successively supplied, one at a time, to the discriminating section 4, where the notes are discriminated, and "1" signal or "0" signal are issued accordingly from terminals JD1 to JD4, the OS terminal, the RS terminal, the DM terminal and the IM terminal.

When a note supplied to the discriminating section 4 is an indiscriminable one, a "1" signal is supplied to the D6 terminal of the latch circuit 36 from the IM terminal of the discriminating section 4, and the note is sent from the section 4. The first gate sensor 9 detects the passage of the indiscriminable note and issues a "1" signal to the t terminal of the latch circuit 36, and as a result, "1" signal are issued from the Q4 terminal and the Q6 terminal of the latch circuit 36 and supplied to the ON input terminal and the OFF input terminal respectively of the first gate 11, caused gate 11 to rotate anti-clockwise from the position shown in Figs. 1 and 2. This causes the indiscriminable note to move through the branch path 3d and into the fourth accumulation section 21.

When the notes supplied to the discriminating section 4 are discriminable and of the same kind as that set at the mode setting section 8, that is the notes are the ones selected or set, the data indicating kind of note coincident with the data indicating kind of note issued from the mode setting section 8 are supplied from terminals JD1 to JD4 of the discriminating section 4, the Exclusive OR gates 28a to 28d in the set note detecting circuit 25. At the same time, a "1" signal is issued from the OS terminal or the RS terminal of the discriminating section 4 in accordance with whether the obverse or reverse surface of the note is uppermost, so the "1" signal is not issued from the AND gate 31 in the set note detecting circuit 25 but from the AND gate 30. The "1" signal thus issued is supplied to each of the AND gates 34 and 35. When the supplied note is an obverse one, the "1" signal is supplied to the AND gate 34 from the OS terminal of the discriminating section 4 and thence to the D2 terminal of the latch circuit 36. Then, as the first gate sensor 9 detects the notes, the latch circuit 36 issues "1" signals from its Q2 terminal causing the first gate sensor 9 to be rotated in a clockwise direction to return to the position shown in Figs. 1 and 2. Accordingly, the notes after passing through the first gate sensor 9, travel straight on and not into the branch path 3d, and then are detected by the second gate sensor 10. Thus, a

"1" signal is supplied to the OFF input terminal of the second gate 12 from the Q2 terminal of the latch circuit 43 so the second gate 12 keeps the position shown in Figs. 1 and 2 and the notes (set obverse note) which have passed through the second gate sensor 10 move through the branch path 3a and the rotary carrier 14 to be accumulated in the first accumulation section 17. In this manner, set obverse notes are accumulated in the first accumulation section 17 until the number of the accumulated notes reaches 100 when the group of 100 notes is supplied to the bundling section 18 and bundled.

When the notes supplied to the discriminating section 4 are the set notes but the reverse ones, the data indicating kind coincident with the data indicating kind issued from the mode setting section 8 are supplied to the set note detecting circuit 25 from terminals JD1 to JD4 of the discriminating section 4 and at the same time, a "1" signal is supplied to the AND gate 35 from the RS terminal of the discriminating section 4 and thence to the D3 terminal of the latch circuit 36. As the first gate sensor 9 detects the notes, "1" signals are issued from the Q3 terminal of the latch circuit 36 and supplied to the OFF input terminal of the first gate 11 and to the D3 terminal of the latch circuit 43. Therefore, the notes which have passed through the first gate sensor 9 travel straight on and are detected by the second gate sensor 10. As a result, "1" signal are supplied from the Q3 terminal of the latch circuit 43 to the ON input terminal of the second gate 12 and the OFF input terminal of the third gate 13, causing the second gate 12 to be rotated in a clockwise direction to project into the branch path 3a, while the third gate maintains the position shown in Figs. 1 and 2. Accordingly, the notes which have passed through the second gate sensor 10 are sent into the second accumulation section 19 through the branch path 3b and the rotary carrier 15.

When a damaged note is supplied to the discriminating section 4, a "1" signal is supplied from the DM terminal of the discriminating section 4 to the inverter 29 in the set note detecting circuit 25 and the D5 terminal of the latch circuit 36. Therefore, a "1" signal is not issued from the set note detecting circuit 25. Then, as the first gate sensor 9 detects the note, "1" signals are supplied to the OFF input terminal of the first gate 11 and to the D5 terminal of the latch circuit 43. Consequently, the note which has passed through the first gate sensor 9 travels straight on. Then, as the second gate sensor 10 detects the note, a "1" signal is supplied to each of the ON input terminals of the second gate 12 and the third gate 13. As a result, the second gate 12 and the third gate 13 are caused to be rotated in a clockwise direction to project into the branch paths 3a and 3b, respectively. Therefore, the note which has passed through the second gate sensor 10 is sent to the third accumulation section 20 through the branch path 3c.

When the note supplied to the discriminating

section 4 is a different kind, the data signals indicating kind according to the supplied note, are issued from terminals JD1 to JD4 of the discriminating section 4. However, these data signals do not coincide with the data signals indicating kind issued from terminals JD1 to JD4 of the mode setting section 8. Therefore, the AND gate 32 in the set note detecting section 25 does not issue a "1" signal, and consequently the "1" signal is supplied to the D4 terminal of the latch circuit 36 from the set note detecting section 25. Then, as the first gate sensor 9 detects the note (different kind note), "1" signals are supplied to the OFF input terminal of the first gate 11 and to the D4 terminal of the latch circuit 43, so the note which has passed through the first gate sensor 9 travels straight on. Then, as the second gate sensor 10 detects the note, the "1" signal is supplied from the Q4 terminal of the latch circuit 43 to the ON input terminals of the second gate 12 and the third gate 13, and, therefore, the second gate 12 and the third gate 13 are caused to be rotated in the same manner as when a damaged note is supplied to the discriminating section 4. As a result, the note which has passed through the second gate sensor 10 is sent into the third accumulation section 20 through the branch path 3c.

The sum arithmetic section 23 receives the "1" signals from the M1 terminal of the mode setting section 8 and the data indicating kind of note from terminals JD1 to JD4 of the mode setting section 8, and decodes data signals ("1" signals or "0" signals) supplied from the discriminating section 4 and the first gate sensor 9 to obtain total number and sum of set obverse notes, total number and sum of set reverse notes and the combined total sum thereof. Each data thus obtained is then supplied to a display device, not shown, which indicates the total number and total sum of the set obverse notes, the total number and the combined total sum thereof. In this manner, in the beginning discrimination mode, the operation of re-discriminating and classifying notes can be carried out. Further, the set reverse notes accumulated in the second accumulation section 19 are again fed into the note supply section 1 as set obverse notes, that is, with the reverse surfaces facing down. Consequently, in accordance with the same operation as that described before, the set reverse notes thus fed into the note supply section 1 are accumulated in the first accumulation section 17, and are supplied to the bundling section 18 to be bundled in 100-note bundles. Further, the mixture of different kind notes and damaged notes which have been accumulated in the third accumulation section 20 is separated into the groups of different kind notes and the group of damaged notes. Since the group of damaged notes is inappropriate for circulation, it is stored to be returned to the Bank of Japan. The different kind notes are classified by kind in a subsequent process.

The operation of the deposit mode will now be explained. Firstly, the group consisting of a mixture of various kinds of notes is changed in the

note supply section 1, and the deposit mode is set at the mode setting section 8, and the start switch, not shown, is operated, putting each section into an operable condition. A "1" signal is issued from the M2 terminal of the mode setting section and supplied to the AND gate 40 through the AND gate 38, in the proper note detecting circuit 37. In the deposit mode, the set note detecting circuit 25 does not issue a "1" signal. Furthermore operating the start switch causes the notes charged in the note supply section 1 to be supplied, one at a time, to the discriminating section 4, where they are discriminated. Consequently, "1" signals or "0" signals are issued from the terminals JD1 to JD4, the OS terminal, the RS terminal and the DM terminal, respectively in a similar manner to the above-mentioned beginning discrimination mode.

When an indiscriminable note is supplied to the discriminating section 4, a "1" signal is supplied to the D6 terminal of the latch circuit 36 from the IM terminal. As a result, the note from the discriminating section 4 is accumulated in the fourth accumulation section 21 in a manner similar to the above-mentioned beginning discrimination mode.

When a note supplied to the discriminating section 4 is a damaged one, a "1" signal issued from the DM terminal of the discriminating section 4 is supplied to the inverter 39 in the proper note detecting circuit 37 and the D5 terminal of the latch circuit 36. Therefore, although the data signals for indicating the specific kind of note is issued from terminals JD1 to JD4 of the discriminating section 4, no "1" signal is issued from the proper note detecting circuit 37. Consequently, due to the supply of the "1" signal to the D5 terminal of the latch circuit 36, the damaged note from the discriminating section 4 is accumulated in the third accumulation section 20 in a manner similar to the above-mentioned beginning discrimination mode.

When a note supplied to the discriminating section 4 is a proper note, the data signal for indicating the specific kind of note issued from terminals JD1 to JD4 of the section 4 is supplied to the OR gate 41 in the proper note detecting circuit 37. In this case, although the "1" signal is issued from the OS terminal or the RS terminal of the discriminating section 4, this "1" signal is not utilized. In the proper note detecting circuit 37, the "1" signal is supplied from its output terminal to the D1 terminal of the latch circuit 36 since data signal indicating the specific kind of note is supplied from the discriminating section 4. Then, as the first gate sensor 9 detects the proper note, a "1" signal is issued from the Q1 terminal of the latch circuit 36 and is supplied to the OFF input terminal of the first gate 11 and the D1 terminal of the latch circuit 43. As a result, the first gate 11 returns to the position shown in Figs. 1 and 2, and the note which has passed through the first gate sensor 9 travels straight on and is detected by the second gate sensor 10. A "1" signal is issued accordingly from the Q1 terminal of the latch

circuit 43 and is supplied to the ON input terminal of the second gate 12 and to the OFF input terminal of the third gate 13 through each of the gates 44 and 45. As a result, the notes which have passed through the second gate sensor 10 are accumulated in the second accumulation section 19.

On the other hand, the sum arithmetic section 23 decodes the data signals supplied from the discriminating section 4 and the first gate sensor 9 by means of the "1" signals supplied from the M2 terminal of the mode setting section 8 into the total number and the total sum of the proper notes and of the damaged notes and the total number and the total sum of the proper and damaged notes combined. The data thus obtained are supplied to a display device, not shown, so as to be indicated.

Thus, in the deposit mode, discrimination and classification can be carried out. Furthermore, the proper notes accumulated in the second accumulation section 19 are classified into groups by specific kinds of notes in a subsequent process, and the damaged notes accumulated in the third accumulation section are dealt within the same way as in the beginning discrimination mode. Furthermore, the deposit mode is effectively utilized to perform the function of separating proper notes and damaged notes.

The operation of the deposit-beginning discrimination will now be explained. Firstly, group of a mixture of various kinds of notes are charged in the note supply section 1, and in the mode setting section 8 the deposit-beginning discrimination is set and the start switch operated to put each section in an operable condition. A "1" signal is issued from the M3 terminal of the mode setting section 8 and supplied to the AND gates 30 and 31 through the OR gate 26 and the AND gate 27 in the set note detecting circuit 25. At the same time, the data signals indicating kind of note issued from terminals JD1 to JD4 of the mode setting section 8 are supplied to the Exclusive OR gates 28a to 28d in the set note detecting circuit 25. Accordingly, the notes charged in the note supply section 1 are accumulated in the corresponding accumulation sections 17 and 19 to 21, in a manner similar to the above-mentioned beginning discrimination mode. In other words, set obverse notes are accumulated in the first accumulation section 17, set reverse notes are accumulated in the second accumulation section 19, different kind and damaged notes are accumulated in the third accumulation section 20, and indiscriminable notes are accumulated in the fourth accumulation section 21.

The sum arithmetic section 23 decodes the data signals issued from the discriminating section 4 and the first gate sensor 9 by means of the "1" signals supplied from the M3 terminal of the mode setting section 8 and the "1" signals supplied from each of the terminals JD1 to JD4 of this mode setting section 8 into the total number and total sum of set obverse notes and of set reverse notes, the sub-total number and the sub-total sum

of the different kind notes and the damaged notes, and the total number and the total sum of set obverse notes, set reverse notes, different notes and damaged notes combined. The data thus obtained are supplied to a display device, to indicate the total number of set obverse notes and the total sum thereof, the total number of set reverse notes and the total sum thereof, the sub-total number of different kind notes and damaged notes and the sub-total sum thereof, and the total number and total sum of set obverse notes, set reverse notes, different kind notes and damaged notes combined. Thus, in the deposit-beginning discrimination mode, the discrimination and classification of the notes can be carried out.

Furthermore, in this embodiment, there are provided the first latch circuit 36 and the second latch circuit 43, so that when the note sent from the discriminating section 4 is detected by the first gate sensor 9, the destination of the classified note is memorized in the latch circuit 36. Therefore, before the note sent from the discriminating section 4 is detected by the second gate sensor 10, a subsequent note can be sent from the discriminating section 4. That is, assuming that the duration of time from when the note sent from the discriminating section 4 is detected by the first gate sensor 9 until when the note is detected by the second gate sensor 10 is T_1 , it is possible to send the notes successively at

the intervals of T_1 . Such a time duration T_1 is very much shorter than the duration of time T_2 , from when the note is sent from the discriminating section 4 until when the note is detected by the second gate sensor 10. As a result, a group of notes fed into the note supply section 1 can be classified quickly.

CLAIMS

1. A bank note arrangement machine which comprises,
 - a discriminating section provided at a note path for discriminating notes and issuing signals in accordance with the result of discrimination,
 - a mode setting section having a plurality of modes and issuing control signals for indicating the classification of the notes in accordance with the mode selected from among said plurality of modes, and
 - a distribution control section for controlling gates to distribute the notes in response to the control signals supplied from the mode setting section and the signals supplied from the discriminating section.
2. A machine according to claim 1 wherein the kind of bank notes can be set by the mode setting section.
3. A bank note arrangement machine substantially as herein described with reference to and as shown in the accompanying drawings.

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